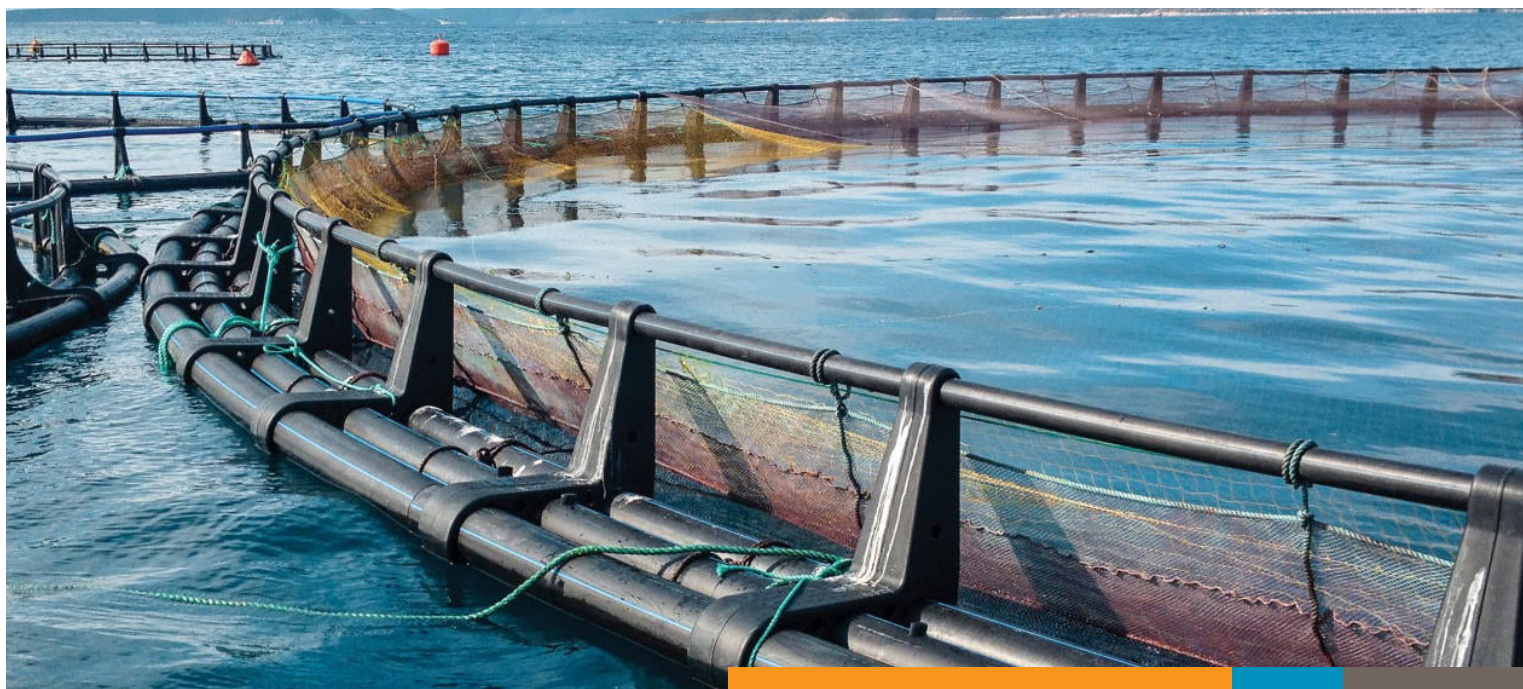


MANAGING YOUR AQUACULTURE FARM FOR LONG-TERM SUCCESS

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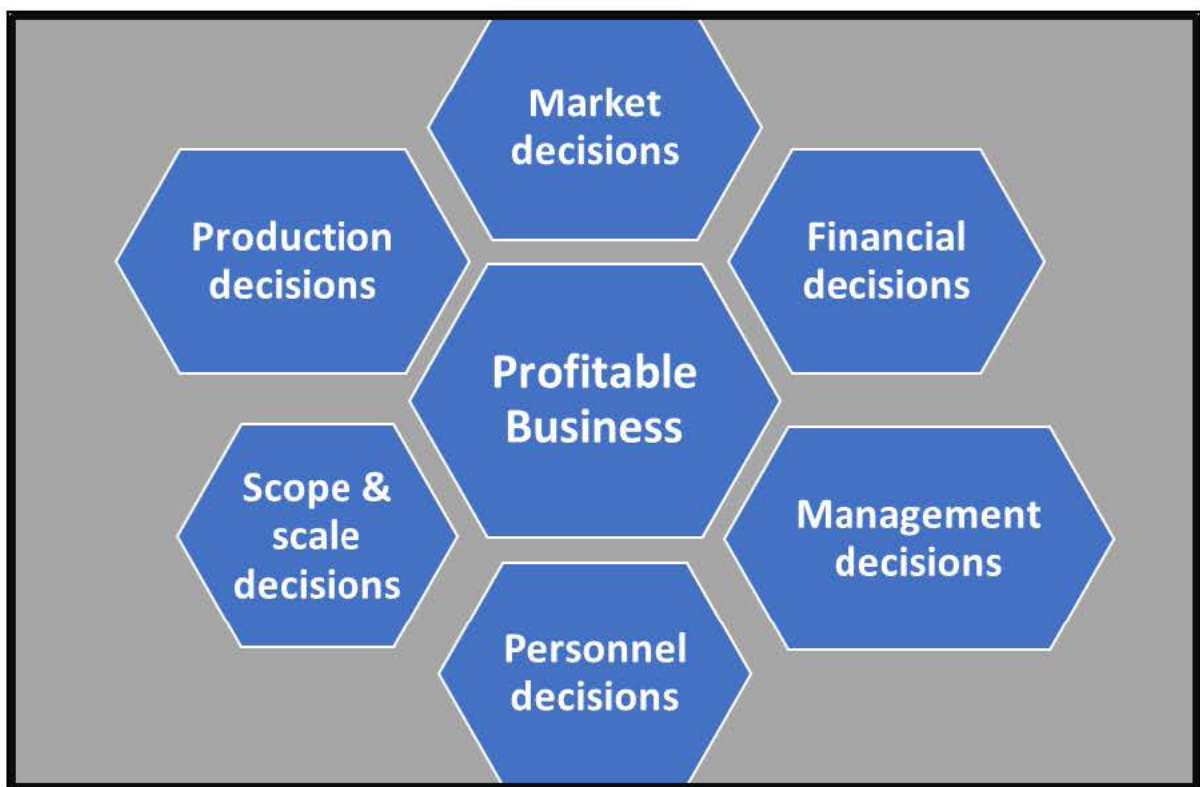
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MANAGING YOUR AQUACULTURE FARM FOR LONG-TERM SUCCESS

Aquaculture farm businesses, like many other types of businesses, are complex. Successful aquaculture farms are those with owners who pay close attention to the details of all phases of the business, from the quality of the feed and other inputs, to production performance (yield, survival, feed conversion), personnel and staff, marketing, and to the financial performance of the business (Figure 1). Many individuals who enjoy raising and farming aquatic animals or plants seek to turn this passion into full-time work. Problems emerge quickly, however, if farm owners and managers spend their time working with the fish and neglect other phases of business management that are equally important. The long-term success of an aquaculture business requires that adequate attention be paid to all components of the

business. Inattention to important details in any specific aspect of the business can result in business failure. Moreover, these various components of the business must fit together seamlessly. For example, the volume produced must match the marketing targets to keep customers satisfied, not just in terms of supplying adequate quantities but also in terms of the preferred time of year for purchases, preferred locations for purchase, and preferred forms of the products sold. Clearly it is critical to have adequate personnel and staffing to ensure efficient operation of the business across all functions. Frequent monitoring of financial statements will provide critical clues as to how well or how poorly the business is performing and to identify those aspects of the business that require more attention.

Figure 1. Successful businesses are complex & require many good decisions. The sum of these decisions becomes the business model



Most people equate economic success with profitability, and over the long-term, the business must be profitable to survive. Unfortunately, many aquaculture businesses are not successful. Business failure is certainly not unique to aquaculture and more businesses fail than succeed. In any discussion of what it takes to manage an aquaculture farm business successfully, it is important to keep in mind, however, that a failure or mistake represents an important learning opportunity. Many of the most successful businesses in the world were developed by individuals who experienced a series of failures, but learned from those failures and went on to create tremendously successful businesses. One such example is that of the Ford Motor Company founded by Henry Ford, now a multinational company that has become a household name around the world. The history of many successful aquaculture businesses also includes a number of mishaps and challenges that led to financial difficulties, and in some cases, bankruptcy. Of these, there are numerous examples of aquaculture businesses whose owners learned from those challenges, and had the determination, resourcefulness, and resiliency to rebound and re-build businesses that have common very successful.

What are some common causes of business failure? To begin with, it is important to understand that aquaculture businesses, by their very nature, are management intensive. As a consequence, one of the leading causes of failure of an aquaculture business is that of inexperienced management. Secondly, most types of aquaculture farms are capital intensive. Thus, insufficient capital, particularly during the startup years has caused many aquaculture businesses to close. There must be adequate capital to acquire or build the facilities and equipment required for the farm to operate efficiently, but there also must be adequate operating capital to pay the bills throughout the early years. Operating capital requirements in the

startup years often are greater than in subsequent years due to the many setbacks that occur frequently during that period. Many aquaculture businesses do not plan adequately for sufficient operating capital and simply run out of cash during the early years.

Most successful aquaculture farm businesses have been built with equity capital from the farm family and expanded gradually over time as the owners developed markets and created supply chains to accommodate the increased supply. Planning for phased-in growth of an aquaculture business is a challenging puzzle. This is especially true for more intensive aquaculture systems that require greater amounts of capital both to construct and equip facilities and to operate efficiently. In most cases, plans are complicated by the need to generate cash revenue in the early years. Poor credit ratings and an inappropriate loan structure can exacerbate business development problems and result in capital shortfalls.

A third common reason for failure of aquaculture businesses is to not have the marketing phase of the business well aligned with production. If the fish or shrimp raised cannot be sold when market size is reached, the inventory of market-sized product will increase and result in unanticipated additional costs to feed and care for that additional inventory. Serious problems can also occur if the fish/shrimp reach market size at a time of the year when consumers are not interested in purchasing that volume of product. Having to hold market-sized fish for those months when consumers wish to purchase it will clearly increase inventories that will increase production costs and cause a cascade of economic and financial woes for the farm.

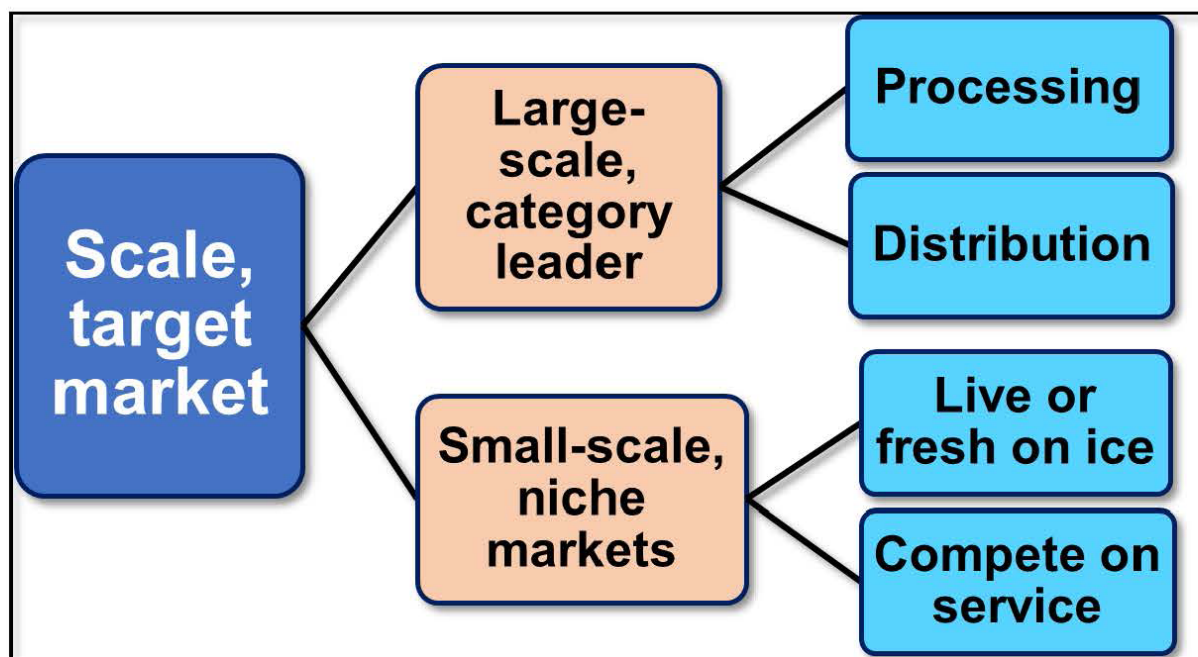
Finally, too many aquaculture business owners do not monitor key financial metrics frequently enough to recognize when problems are beginning to emerge.

Early recognition of problems allows aquaculture farm owners to take smaller and less drastic corrective actions. Waiting until the farm checking account does not have enough cash to pay bills often means that drastic actions may be required to overcome what may have turned into a crisis for the farm business.

The marketing strategy of the business should be at the forefront of discussions and analysis of all aquaculture businesses (Engle et al. 2017). Early decisions made related to the choice of the market to be targeted will affect all subsequent farm business decisions, beginning with decisions related to the scope and scale of the business. Figure 2 illustrates the type of decision tree to make critical decisions about the overall position of the aquaculture farm in the market place. Any successful marketing strategy must address the key

question of how it will compete with other similar products for consumer spending. One of these key underlying decisions is whether the business plans to compete on price or on some other attribute. If the overall plan is to compete on price, then that means that the business will need to become a large-scale, category leader in that industry segment. Large-scale production further will require processing facilities as well as the ability to distribute products to key markets. Planning for complex functions such as processing, transportation, warehousing and other components of distribution and logistics requires the same degree of care and attention as that of the farm itself. If the business plans to sell into export markets, then additional analysis is needed related to the additional investment and/or staffing that will be necessary to meet and verify compliance with stringent quality requirements in export markets.

Figure 2. Can you compete on price?



If the plan for the business is to operate on a smaller scale, then the marketing strategy will need to focus on ways to compete on some attribute other than price. The targeted market will need to be a smaller,

niche type of market. There are many aquaculture businesses of medium scale that have created and developed markets based on outstanding customer service, product freshness, and development of

customer loyalty for the products of their specific farm. By focusing on their ability to consistently provide a high level of quality and service to their customers, many of these businesses have been able to sell at higher prices. It takes time, however, to develop long-lasting market relationships that are built on the ability of the farm to ensure that each unit of product that leaves the farm meets the high expectations of its customers.

The effectiveness of management is key to the success of an aquaculture business. From an economics perspective, “management” refers to all decisions that are made across the entire business. For the production phase of the business, key management decisions are those related to stocking densities, sizes at stocking, levels of aeration, and the type of feed that will be fed, among others. Each of these decisions will affect the growth rate, which will affect when the fish or shrimp raised will reach market size and be available for sale. These decisions also affect the quantities of product available for sale. Overall farm costs will be affected strongly by the degree to which the farm business is able to move feed and other inputs onto the farm, through the production and processing phases and to be distributed through the supply chain, in one smooth flow. Delays and interruptions along the way inevitably increase costs and also disappoint or possibly alienate customers who were looking forward to receiving the products.

For an aquaculture business to function efficiently and smoothly, appropriate personnel and staffing are needed. Figure 3 illustrates several types of business functions that require various types of skill sets. All aquaculture businesses need for someone to attend to each of these functions promptly and skillfully. Any one individual, with the appropriate mix of skills, may be able to perform more than one function. On smaller farms, it is necessary for individuals to assume responsibility for multiple

functions of the business. Problems emerge, however, if the farm does not have personnel or staff with the training or experience to handle all these functions. In such cases, it is critical to seek out the training needed or to find a way to contract it from off the farm. There clearly are obvious trade-offs. If the owner or manager of the farm has strong mechanical skills, then repairs and maintenance work can likely be done on the farm at lower cost than having to take equipment off farm for repairs, but will take time away from feeding fish and monitoring water quality. Marketing functions require an individual with excellent interpersonal skills; individuals who enjoy attending to fish or shrimp crops may not be best suited to handling the marketing phases of the business.

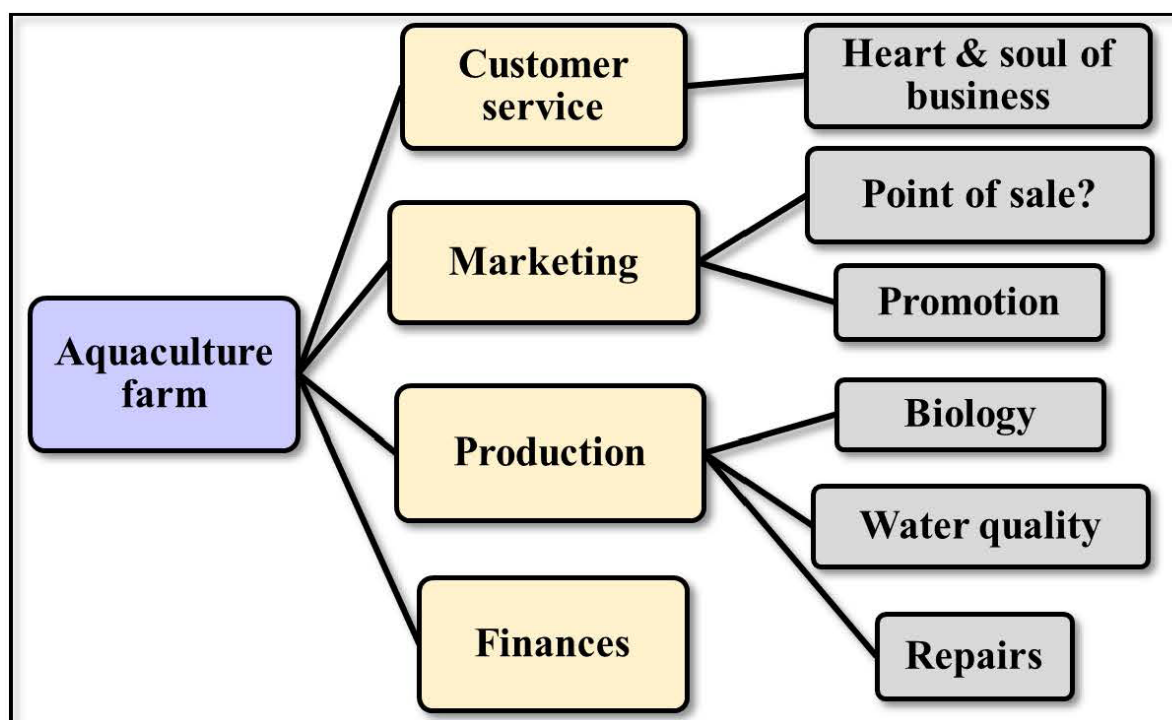
Adequate attention paid to monitoring financial statements will provide early warning of emerging problems, if the owner knows where to look. The following will provide an overview of how to keep an eye on the overall financial performance as a way to steer the business in a successful direction. While most people focus on profitability of a business, more businesses fail due to cash flow problems than for any other reason. Thus, it is vital for the business owner to monitor cash flow each month, to assess whether cash flow problems are emerging and, if so, to design strategies to avoid serious cash flow problems.

Table 1 presents a monthly cash flow budget for a hypothetical shrimp farm. Cash flow budgeting and planning focuses on ensuring that the business will have enough cash when needed to pay all bills when due. Profitable businesses can and do fail due to severe cash deficits, particularly in the early years of the business. Thus, every aquaculture farm, regardless of size, should develop a cash flow budget at the beginning of the year. The budgeted projections of cash receipts and cash expenditures need to

be compared each month with the actual cash receipts and cash expenses for that month. Any noticeable deviations must be assessed carefully to determine what caused

the deviation from what was projected and whether that condition is likely to become worse or to self-correct in the next month or two.

Figure 3. Personnel and staffing considerations



There are many resources available for those who do not have a cash flow budget for their farm. Engle (2019, 2010, and 2012a) provide some examples. Engle (2012b) is available for download at no cost from the Southern Regional Aquaculture Center (<https://srac.tamu.edu/>) and provides specific detail on developing a cash flow budget. The first step to develop a cash flow budget is to project and forecast sales revenue for each month of the coming year. The monthly projected sales become the monthly cash inflow for the business.

The second step is to project cash expenditures for each month for each line item. The most useful cash flow budgets are those that are very detailed and account for each type of expense for each month. By preparing and monitoring all expenses and

receipts, it is easier to see which have deviated from that projected to be able to work through options to address potential cash shortfalls. Once all cash receipts and expenditures have been itemized, the total cash outflow is subtracted from the total cash inflow for each month to determine the amount of cash that will be available for each month after all expenses have been paid. The cash available line will show clearly the months in which cash receipts are sufficient to cover cash expenses as well as those months in which a cash deficit is likely to occur. A well-constructed cash flow budget forms a solid basis for structuring operating loans or an operating line of credit because it shows when additional operating capital will be required as well as when the operating loan can be paid back.

Table 1. Monthly cash flow budget for shrimp farm

Item	Jan.	Feb.	March	April	May	June	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Beginning Cash	15,000	790	1,404	852	9,850	1,590	1,163	1,561	4,559	1,257	1,780	1,136
Shrimp sales	-	-	-	95,000	-	-	-	100,000	-	-	-	85,000
CASH INFLOW	15,000	790	1,404	95,852	9,850	1,590	1,163	101,561	4,559	1,257	1,780	86,136
Production costs												
Postlarvae	19,000			-	19,000				19,000			
Feed	2,895	2,895	2,895	2,895	2,895	2,895	2,895	2,895	2,895	2,895	2,895	2,895
Amendments	1,468	1,468	1,468	1,468	1,468	1,468	1,468	1,468	1,468	1,468	1,468	1,468
Electricity	152	152	152	152	152	152	152	152	152	152	152	152
Repairs & maint.	966	966	966	966	966	966	966	966	966	966	966	966
Sludge disposal	9	9	9	9	9	9	9	9	9	9	9	9
Labor	2,768	2,768	2,768	2,768	2,768	2,768	2,768	2,768	2,768	2,768	2,768	2,768
Telephone	52	52	52	52	52	52	52	52	52	52	52	52
Office supplies	11	11	11	11	11	11	11	11	11	11	11	11
Gas and diesel	281	281	281	281	281	281	281	281	281	281	281	281
Management	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Capital replacement								5,000				
Loan payments												
Real estate	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400
Equipment	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Operating												
Principal				\$66,000		-		72,000	-	-	-	77,000
Interest	208	383	550	-	258	425	600	-	300	475	642	217
Total Expenses	39,210	20,385	20,552	86,002	39,260	20,427	20,602	97,002	39,302	20,477	20,644	97,219
Cash Available	(24,210)	(19,596)	(19,148)	9,850	(29,410)	(18,837)	(19,439)	4,559	(34,743)	(19,220)	(18,864)	(11,082)
New Borrowing	25,000	21,000	20,000	-	31,000	20,000	21,000		36,000	21,000	20,000	26,000
Ending Cash	790	1,404	852	9,850	1,590	1,163	1,561	4,559	1,257	1,780	1,136	14,918
Operating Loan Bal.	25,000	46,000	66,000	-	31,000	51,000	72,000	-	36,000	57,000	77,000	26,000

The most common mistakes made in developing a cash flow budget are to make overly optimistic projections by over-estimating sales receipts and under-estimating cash expenses. Farmers, by nature, tend to be optimists (they have to be to continue farming), and have a strong

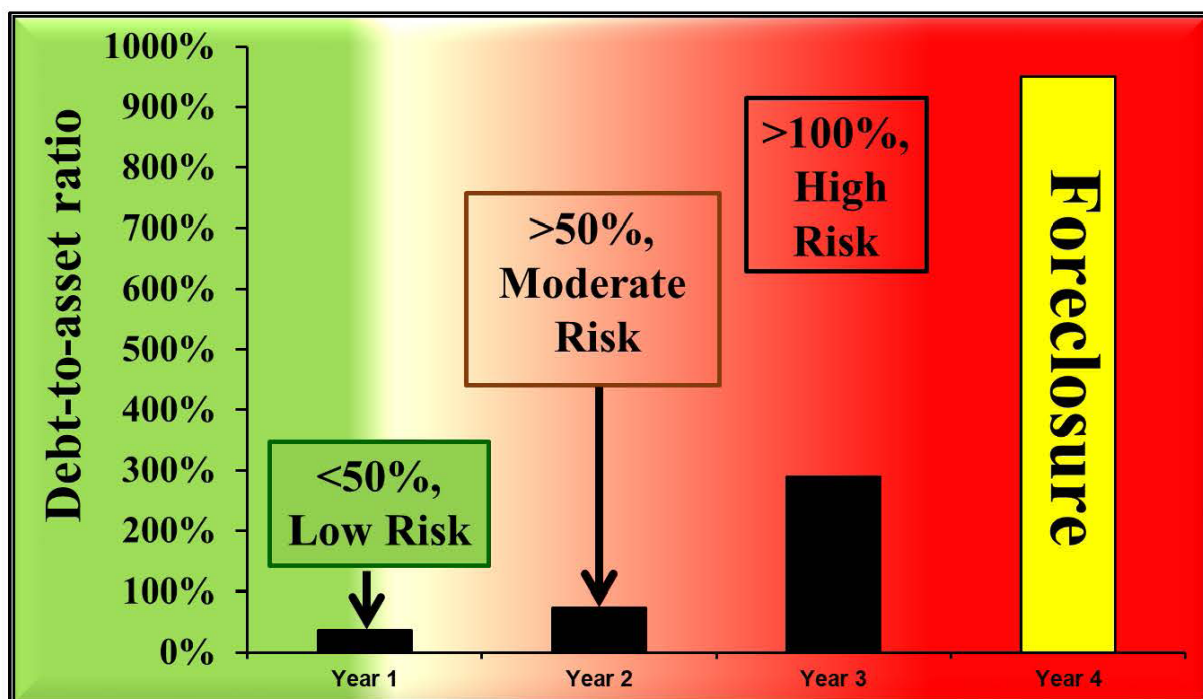
tendency to believe that fish and shrimp will be sold sooner than they are and in greater quantities than what often happens. It is far better to be conservative with lower-than-expected volumes of product sold and a later harvest date than that achievable under ideal conditions. It is important to

remember that projections of sales revenue must be based not on the quantity produced but on realistic estimates of when those fish will be sold. Most farms must hold some amount of market-ready product for a period of time until that product can be sold to consumers. Similarly, many farmers under-estimate expenses. Expense projections must include estimates to cover contingencies such as un-expected repairs and accidents. Past records should be used to estimate repair and other non-routine expenses, but additional contingency planning is essential to have adequate cash on hand to cover the many adverse un-anticipated events that affect farms.

The second important financial statement to monitor on the farm is that of the balance

sheet to understand the financial position of the aquaculture farm business (Engle 2012c). The balance sheet details the value of assets in the business as well as the value of liabilities, the outstanding debt payments, including those due and payable in the coming year. The balance sheet should be examined at least once a year to know, among other things, whether additional borrowing would put the business in a high-risk financial position or not. One quick way to determine the degree of financial risk in the business is to calculate the debt-to-asset ratio, by dividing the value of total liabilities by total assets and multiplying by 100. If the debt-to-asset ratio is less than 40% to 50%, the business is in a position to assume additional risk; if greater than 50%, it is not (Figure 4).

Figure 4. Debt-to-asset ratio as early warning of excessive financial risk



The third financial statement to monitor for the aquaculture farm business is the Profit and Loss Statement, or P & L (Engle 2012d). As with the balance sheet, it should be monitored at least once a year. The bottomline on the P & L is the Net Farm Income which provides a measure of

profitability for the business for the past year.

An in-depth review of all financial statements, production performance, performance of personnel and staff, and marketing results should be conducted at least once a year. The financial statements

will provide clues as to the greatest strengths and weaknesses of the farm business that can then be used in conjunction with the assessment of production, personnel, and marketing performance to revise goals and strategies for the coming year. Table 2 illustrates a format that could be used as a first step to

identify the greatest financial strengths and weaknesses of the business. This annual evaluation should lead to conclusions each year as to whether the farm business accomplished the goals set for that year or not, and to set new goals for the upcoming year.

Table 2. Annual Checkup of Financial Performance

Indicator	Interpretation	Good	Marginal	Problem
CASH FLOW (From the Cash Flow Budget)				
Ending cash balance	If higher than beginning, good; marginal if slightly lower than beginning; problem if a great deal lower than beginning			
Outstanding operating loan balance, end of year	If lower than beginning of year, good; marginal if slightly higher than at beginning; problem if a great deal higher than beginning of year.			
Percent revenue can decline & still meet cash flow	Good if greater than 25%; marginal at 15%; problem if less than 15%.			
Percent operating expenses can increase & still meet cash flow obligations	Good if greater than 15%; marginal at 10 to 15%; problem if less than 10%.			
FINANCIAL POSITION (From the Balance Sheet)				
Current ratio	Good if greater than 1.5; marginal if 1-1.5; problem if less than 1.0			
Debt-to-asset ratio	Good if less than 40%; marginal if 40-65%; problem if 65% or more.			
Net worth	Good if positive & increasing from year to year; marginal if decreasing, or low, but still positive; problem if negative			
PROFITABILITY (From the Income Statement, or Profit & Loss Statement)				
Net farm income	Good if positive and high; marginal if positive, but low; problem if negative			

Following the annual review, corrective actions that address the greatest weaknesses on the farm need to be undertaken. For example, if cash flow emerges as the greatest problem, then the farm business needs to set goals to improve cash flow and develop strategies to do so. Long-term goals for a business should include maintaining a minimum of cash reserves

sufficient to be able to continue the business without additional revenue for a period of about 6 months. Other long-term solutions for cash flow problems might include diversifying production with a crop that produces revenue when deficits occur in the primary crop. Careful thought, however, must go into decisions to produce multiple crops due to the added complexity of

managing more than one. Long-term cash flow problems may be the result of underlying profitability problems that require examination of potential new products or markets or cost-effective production improvements.

In the short term, options for managing cash flow problems involve reducing expenses and/or finding other sources of revenue. Solutions may include: 1) postponement of equipment purchases, construction, or renovations; and/or 2) re-structuring loan payments to coincide with months when cash surpluses are common. A carefully developed, comprehensive cash flow budget forms a sound basis for loan re-structuring discussions with lenders.

New operating loans or increasing the limit on operating lines of credit are also options to address cash flow problems, but farmers should first evaluate carefully the financial consequences in terms of financial risk for the business. An over-leveraged business (that has too great a debt load) may find that its debt load drives business decisions more than productivity.

With severe cash flow deficits, more extreme measures are necessary. Potential strategies to secure much-needed cash to pay bills include: 1) seeking off-farm employment; and 2) sale of assets such as land or equipment. While generally more profitable to purchase than to lease equipment, business survival depends upon paying bills. Leasing necessary equipment may reduce cash outlays until such time as

the business is in a position to re-purchase the equipment.

The annual assessment of farm performance should include strategic thought about how the business is positioned. Over time, markets for specific products become saturated and it is necessary to develop new products. All successful products attract competition and successful businesses are those that plan to stay ahead of future competition. Re-evaluating the supply chain periodically may reveal opportunities to enhance financial performance through new supply relationships or accessing new markets. New technologies may be emerging that have potential to enhance production or processing efficiencies and reduce costs. It is essential to plan to re-build facilities when they become less productive and to replace equipment when it wears out.

In summary, the best way to achieve long-term economic success is to perform an annual analysis of the farm's production and financial performance. Such an evaluation should consider not just production metrics such as yield, feed conversion ratio, and survival, but also cash flow, financial position, and profitability. Most importantly, new specific goals should be set for the coming year that are focused on addressing the greatest weaknesses identified in the business. Incremental improvements in performance each year is the best way for an aquaculture farm business to be successful over the long term.

About the Author



Dr. Carole Engle is an aquaculture economist with more than 40 years of research, extension, and teaching experience,

devoted entirely to the economics and marketing of aquaculture. Engle has worked across the world on various economics and marketing topics related to shrimp/prawns, tilapia, carp, pacu, shellfish, seaweed, trout, catfish, hybrid striped bass, baitfish, and sportfish aquaculture and for production systems that include ponds, raceways, aquaponics, RAS, and various types of both suspended and bottom culture methods for shellfish. Engle is immediate past Editor-in-Chief of the scientific journal, *Aquaculture Economics & Management*, and immediate past-President of the International Association of Aquaculture Economics & Management.

Engle has also served as past-President of the U.S. Aquaculture Society and is the immediate past-Executive Editor of the *Journal of the World Aquaculture Society*. Publications include: 5 books (including the 2019 printing of *Aquaculture Businesses* as well as *Aquaculture Economics and Financing*, and the 2017 2nd edition of the *Aquaculture Marketing Handbook*), 138 refereed journal articles, 19 editorials, 19 magazine columns, 50 book chapters & monographs, 20 proceedings articles, and 120 extension fact sheets/popular articles. Grants and contracts total 91 different externally funded awards with total grant funding received of \$22.9 million. Engle has been honored with the Distinguished Service Award from the U.S. Aquaculture Society, the McCraren Award from the National Aquaculture Association (three times), Researcher of the Year from the Catfish Farmers of America and Distinguished Service Award from the Catfish Farmers of Arkansas (twice).

Soy In Aquaculture Program

This technical paper was created through the USSEC Soy In Aquaculture (SIA) program and the USSEC Southeast Asian Regional Program. USSEC works with target audiences in Southeast Asia and globally to show the utility and benefits of using United States soybean products in aquaculture diets.

The SIA program replaces the Managed Aquaculture Marketing and Research Program (the AquaSoy Initiative, funded and supported by the United Soybean Board and American Soybean Association) which was designed to remove the barrier to soybean meal use in diets fed to aquaculture species.

The objective of the SIA is to optimize soy product use in aquaculture diets and to create a preference for U.S. soy products in particular, including but not limited to U.S. soybean meal, soybean oil, soybean lecithin, and “advanced soy proteins” such as fermented soy and soybean protein concentrate.

This paper follows the tradition of USSEC to provide useful technical materials to target audiences in the aquaculture industry.

For more information on soybean use in aquaculture and to view additional technical papers, please visit the Soy-In-Aquaculture website at www.soyaqua.org.

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